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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,048	04/26/2001	Kazuki Hayata	81716.0076	1455

26021 7590 04/08/2004

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EXAMINER	
DAO, MINH D	
ART UNIT	**PAPER NUMBER**
2682	8

DATE MAILED: 04/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/845,048	HAYATA ET AL.	
	Examiner	Art Unit	
	MINH D DAO	2682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-24_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _3-6 and 9-24_ is/are allowed.

6)☒ Claim(s) _1 and 2_ is/are rejected.

7)☒ Claim(s) _7,8_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _3,4,6,7_.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Sato (JP 2000-22407). A copy of the translation of this patent is attached.

Regarding claim 1, Sato teaches a structure for connecting a non-radiative dielectric waveguide and a metal waveguide comprising: a non-radiative dielectric waveguide including: parallel planar conductors (see translation of the abstract, lines 6-9; drawing 1, items 1 and 2) arranged at a spacing of not more than half the wavelength of a high-frequency signal (see translation of the abstract, lines 6-9), and a dielectric strip for propagating the high-frequency signal (see translation of the abstract, lines 5-6), the dielectric strip being disposed between the parallel planar conductors and provided at an end face of a terminal end of the dielectric strip with a conductive member (see drawing 1, items 3 and 3a); and a metal waveguide having an open terminal end connected to an aperture which is formed in at least one of the parallel planar

conductors at a location (see abstract, lines 8-9, waveguide B) where an electrical field of an LSM mode stationary wave propagating along the dielectric strip becomes largest (See the translation of the abstract, 11-12).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato(JP 2000-22407).

Regarding claim 2, Sato teaches a structure for connecting a non-radiative dielectric waveguide and a metal waveguide comprising: a non-radiative dielectric waveguide including: parallel planar conductors arranged at a spacing of not more than half the wavelength of a high-frequency signal, and a dielectric strip for propagating the high-frequency signal, the dielectric strip being disposed between the parallel planar conductors and provided at an end face of a terminal end of the dielectric strip with a conductive member; and a metal waveguide having terminal ends one of which is closed and the other of which is open, an aperture being formed in at least one of the parallel planar conductors at a location where an electrical field of an LSM mode stationary wave propagating along the dielectric strip becomes largest (See the translation of the abstract, 11-12). Sato fails to disclose an aperture being connected with an aperture provided in a lateral face of the metal waveguide having the closed terminal end and open terminal end, at a position of n/2 +1/4 (wherein n is an integer of 0 or greater) times the wavelength in the waveguide from the closed terminal. However, absent a showing to the contrary, discovering particular ranges within a range disclosed by the applicant would obviously be within the skill of the art. Therefore, it would been obvious to one of ordinary skill in the art at the time of the invention was made to design an aperture being connected with an aperture provided in a lateral face of the metal waveguide having the closed terminal end and open terminal end, at a position of n/2

+1/4 (wherein n is an integer of 0 or greater) times the wavelength in the waveguide from the closed terminal in order to obtain maximum wave propagation along the dielectric strip.

Allowable Subject Matter

2. Claims 3-6, 9-24 allowed.

3. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following is an examiner's statement of reasons for allowance:

Regarding claim 3, reference Sato teaches a structure for connecting a non-radiative dielectric waveguide and a metal waveguide comprising: a non-radiative dielectric waveguide including: parallel planar conductors arranged at a spacing of not more than half the wavelength of a high-frequency signal, a dielectric strip for propagating the high-frequency signal, the dielectric strip being disposed between the parallel planar conductors; and a metal waveguide having an open terminal end connected to an aperture which is formed in at least one of the parallel planar conductors at a location where an electrical field of an LSM mode stationary wave propagating along the

dielectric strip becomes largest (see rejection for claim 1). However, Sato fails to teach electromagnetic shielding members arranged along both sides of a terminal end of the dielectric strip.

Regarding claim 4, reference Sato teaches a structure for connecting a non-radiative dielectric waveguide and a metal waveguide comprising: a non-radiative dielectric waveguide including: parallel planar conductors arranged at a spacing of not more than half the wavelength of a high-frequency signal, a dielectric strip for propagating the high-frequency signal, the dielectric strip being disposed between the parallel planar conductors; and a metal waveguide having terminal ends one of which is closed and the other of which is open, an aperture being formed in at least one of the parallel planar conductors at a location where an electrical field of an LSM mode stationary wave propagating along the dielectric strip becomes largest, the aperture being connected with an aperture provided in a lateral face of the metal waveguide having the closed terminal end and open terminal end, at a position of n/2+1/4 (wherein n is an integer of 0 or greater) times the wavelength in the waveguide from the closed terminal (see rejection for claim 2). However, Sato fails to teach electromagnetic shielding members arranged along both sides of a terminal end of the dielectric strip.

Regarding claim 13, reference Sato teaches a millimeter wave transmitter/receiver comprising: parallel planar conductors disposed at a spacing of not more than half the wavelength of the high-frequency signal; a first dielectric strip for propagating a

millimeter wave signal that is output from a high-frequency generation element placed at one end of the first dielectric strip (see rejection for claim 2). However, Sato fails to teach a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a bias voltage applied to electrodes of the variable capacitance diode, the variable capacitance diode being disposed such that the direction in which this bias voltage is applied coincides with the direction of an electric field of the millimeter wave signal; a second dielectric strip, one end of the second dielectric strip being disposed near the first dielectric strip so as to be electromagnetically coupled, or being joined to the first dielectric strip; a circulator having a first connection portion, a second connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, which connection portions serve as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or anti-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip; a third dielectric strip for propagating the millimeter wave signal, which is joined to the second connection portion of the circulator, and has a transmitter/receiver antenna at a front end thereof; a fourth dielectric strip; and a mixer portion for generating an intermediate frequency signal by mixing a portion of the millimeter wave signal and a received wave, the mixer portion being made by placing an intermediate portion of the second dielectric

strip near an intermediate portion of the fourth dielectric strip to electromagnetically couple, or joining the second dielectric strip and the fourth dielectric strip together, the second dielectric strip propagating a portion of the millimeter wave signal toward a mixer, the fourth dielectric strip propagating a received wave that is received with the transmitter/receiver antenna, propagated along the third dielectric strip, and outputted from the third connection portion of the circulator, toward the mixer, the first to fourth dielectric strips, the variable capacitance diode, the circulator and the mixer portion being arranged between the parallel planar conductors, wherein a conductive member is provided at an end face of a terminal end of the third dielectric strip, and an aperture is formed in at least one of the parallel planar conductors at a location where the electrical field of an LSM mode stationary wave propagating along the third dielectric strip becomes largest, the millimeter wave transmitter/receiver comprising: a metal waveguide having an open terminal end connected to the aperture, and the other end at which the transmitter/receiver antenna is provided.

Regarding claim 14, reference Sato teaches a millimeter wave transmitter/receiver comprising: parallel planar conductors disposed at a spacing of not more than half the wavelength of the high-frequency signal; a first dielectric strip for propagating a millimeter wave signal that is output from a high-frequency generation element placed at one end of the first dielectric strip (see rejection for claim 2). However, Sato fails to teach a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a

bias voltage applied to electrodes of the variable capacitance diode, the variable capacitance diode being disposed such that the direction in which this bias voltage is applied coincides with the direction of an electric field of the millimeter wave signal; a second dielectric strip having one end disposed near the first dielectric strip so as to be electromagnetically coupled, or joined to the first dielectric strip; a circulator having a first connection portion, a second connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, and serving as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or anti-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip; a third dielectric strip for propagating the millimeter wave signal, which is joined to the second connection portion of the circulator, and has a transmitting antenna at a front end thereof; a fourth dielectric strip provided with a receiving antenna at a front end thereof; a fifth dielectric strip connected to the third connection portion of the circulator, for propagating a millimeter wave signal received and mixed with the transmitting antenna and attenuating the millimeter wave signal at a non-reflective terminal end arranged at a front end of the fifth dielectric strip; and a mixer portion for generating an intermediate frequency signal by mixing a portion of the millimeter wave signal and a received wave, the mixer portion being made by placing an intermediate portion of the second dielectric strip near an intermediate portion of the

fourth dielectric strip to electromagnetically couple, or joining the second dielectric strip and the fourth dielectric strip together, the second dielectric strip propagating a portion of the millimeter wave signal toward a mixer, the mixer being provided at the other end of the fourth dielectric strip, the first to fifth dielectric strips, the variable capacitance diode, the circulator and the mixer portion being arranged between the parallel planar conductors, wherein a conductive member is provided at an end face of a terminal end of each of the third and fourth dielectric strips, and an aperture is formed in at least one of the parallel planar conductors at a location where the electrical field of an LSM mode stationary wave propagating along each of the third and fourth dielectric strip becomes largest, the millimeter wave transmitter/receiver comprising: metal waveguides having an open terminal end connected to the aperture, and the other end at which the transmitting antenna or the receiving antenna is provided.

Regarding claim 19, reference Sato teaches a millimeter wave transmitter/receiver comprising: parallel planar conductors disposed at a spacing of not more than half the wavelength of the high-frequency signal; a first dielectric strip for propagating a millimeter wave signal that is output from a high-frequency generation element placed at one end of the first dielectric strip (see rejection for claim 2). However, Sato fails to teach a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a bias voltage applied to electrodes of the variable capacitance diode, the variable capacitance diode being disposed such that the direction in which this bias voltage is

applied coincides with the direction of an electric field of the millimeter wave signal; a second dielectric strip, one end of the second dielectric strip being disposed near the first dielectric strip so as to be electromagnetically coupled, or being joined to the first dielectric strip; a circulator having a first connection portion, a second connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, which connection portions serve as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or anti-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip; a third dielectric strip for propagating the millimeter wave signal, which is joined to the second connection portion of the circulator, and has a transmitter/receiver antenna at a front end thereof; a fourth dielectric strip; and a mixer portion for generating an intermediate frequency signal by mixing a portion of the millimeter wave signal and a received wave, the mixer portion being made by placing an intermediate portion of the second dielectric strip near an intermediate portion of the fourth dielectric strip to electromagnetically couple, or joining the second dielectric strip and the fourth dielectric strip together, the second dielectric strip propagating a portion of the millimeter wave signal toward a mixer, the fourth dielectric strip propagating a received wave that is received with the transmitter/receiver antenna, propagated along the third dielectric strip, and outputted from the third connection portion of the circulator, toward the mixer, the first to fourth

dielectric strips, the variable capacitance diode, the circulator and the mixer portion being arranged between the parallel planar conductors, wherein electromagnetic shielding members are provided along lateral faces of a terminal end of the third dielectric strip, and an aperture is formed in at least one of the parallel planar conductors at a location where the electrical field of an LSM mode stationary wave propagating along the third dielectric strip becomes largest, the millimeter wave transmitter/receiver comprising: a metal waveguide having an open terminal end connected to the aperture, and the other end at which the transmitter/receiver antenna is provided.

Regarding claim 20, reference Sato teaches a millimeter wave transmitter/receiver comprising: parallel planar conductors disposed at a spacing of not more than half the wavelength of the high-frequency signal; a first dielectric strip for propagating a millimeter wave signal that is output from a high-frequency generation element placed at one end of the first dielectric strip (see rejection for claim 2). However, Sato fails to teach a variable capacitance diode for outputting the millimeter wave signal as a frequency modulated transmission millimeter wave signal, by periodically controlling a bias voltage applied to electrodes of the variable capacitance diode, the variable capacitance diode being disposed such that the direction in which this bias voltage is applied coincides with the direction of an electric field of the millimeter wave signal; a second dielectric strip having one end disposed near the first dielectric strip so as to be electromagnetically coupled, or joined to the first dielectric strip; a circulator having a

first connection portion, a second connection portion, and a third connection portion arranged at predetermined spacings along a perimeter of a ferrite disk arranged in parallel to the parallel planar conductors, and serving as input/output terminals for the millimeter wave signal, the circulator outputting the millimeter wave signal inputted into one of the connection portions from another connection portion that is adjacent in clockwise or anti-clockwise circulation within a plane of the ferrite disk, the first connection portion being connected to an output terminal of the millimeter wave signal of the first dielectric strip; a third dielectric strip for propagating the millimeter wave signal, which is joined to the second connection portion of the circulator, and has a transmitting antenna at a front end thereof; a fourth dielectric strip provided with a receiving antenna at a front end thereof; a fifth dielectric strip connected to the third connection portion of the circulator, for propagating a millimeter wave signal received and mixed with the transmitting antenna and attenuating the millimeter wave signal at a non-reflective terminal end arranged at a front end of the fifth dielectric strip; and a mixer portion for generating an intermediate frequency signal by mixing a portion of the millimeter wave signal and a received wave, the mixer portion being made by placing an intermediate portion of the second dielectric strip near an intermediate portion of the fourth dielectric strip to electromagnetically couple, or joining the second dielectric strip and the fourth dielectric strip together, the second dielectric strip propagating a portion of the millimeter wave signal toward a mixer, the mixer being provided at the other end of the fourth dielectric strip, the first to fifth dielectric strips, the variable capacitance diode, the circulator and the mixer portion being arranged between the parallel planar

conductors, wherein an electromagnetic shielding member is provided along lateral faces of a terminal end of each of the third and fourth dielectric strips, and an aperture is formed in at least one of the parallel planar conductors at a location where the electrical field of an LSM mode stationary wave propagating along each of the third and fourth dielectric strip becomes largest, the millimeter wave transmitter/receiver comprising: metal waveguides having an open terminal end connected to the aperture, and the other end at which the transmitting antenna or the receiving antenna is provided.

Regarding claim 7, reference Sato teaches the limitations of claim 1. However, Sato fails to teach an aperture antenna or flat antenna connected to the open terminal of the metal waveguide of the connection structure.

Regarding claim 8, reference Sato teaches the limitations of claim 2. However, Sato fails to teach an aperture antenna or flat antenna connected to the open terminal of the metal waveguide of the connection structure.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Nakamo (US 5,453,755) DISCLOSES Circularly-Polarized-Wave Flat Antenna.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MINH D DAO whose telephone number is 703-305-5589. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, VIVIAN C CHIN can be reached on 703-308-6739. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Minh Dao
Examiner
Art unit 2682
April 3, 2004 mn

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600
4/5/04